Association of backfat thickness with postheparin lipoprotein lipase activity and very low density lipoprotein-subfractions in growing pigs

ABSTRACT

Sixteen pigs from 2 distinct genetic lines (LGAH and VFIL) obtained after eight generations of divergent selection for high (H) and low (L) lean tissue growth rate with ad-libitum feeding (LGA) and voluntary feed intake (VFI), respectively, were used in this study. The objectives of this investigation were to establish appropriate working conditions for the postheparin plasma lipoprotein lipase (LPL) assay and to study relationships between fat deposition and plasma lipids, very low density lipoprotein (VLDL) lipids, VLDL-subfractions and postheparin plasma LPL activity in growing pigs. Four preliminary experiments were performed to determine the appropriate working conditions for the postheparin plasma LPL assays. Postheparin plasma preincubated with SDS (20-50 mM) at 26°C for 45 minutes inhibited hepatic lipase activity. A total of 2 εl VLDL/assay produced maximum stimulation of LPL activity. Postheparin plasma protein and increasing incubation time contributed an optimum response. LGAH pigs had a significantly higher proportion subfraction 2 than VFIL pigs. No differences were observed in postheparin plasma LPL activity and backfat thickness for two lines of pigs. There were positive correlations between backfat thickness and proportion of subfractions 2 and postheparin plasma LPL activity but the results were not statistically significant. Backfat thickness was not statistically correlated with proportion of subfraction 2 and postheparin plasma LPL activity in a multiple regression analysis. It is believed that the apolipoprotein E, which is present in higher quantities in VLDL-subfraction 2 plays an important role for clearing VLDL triacylglycerol into adipose tissue. LPL activity of pigs can be measured by using postheparin plasma technique. If the relationships of backfat thickness and VLDL-subfraction 2 and postheparin plasma LPL activity can be established, it suggests that these parameters could be used as indicators in selection programmes. Further experiments need to be conducted by using larger sample size and different breed of pigs with greater differences in backfat thicknesses to confirm these trends.

Keyword: Backfat thickness; Lipoprotein lipase; Postheparin plasma; Very low density lipoprotein; VLDL-subfractions